Microburst Detection with NEXRAD AMDA

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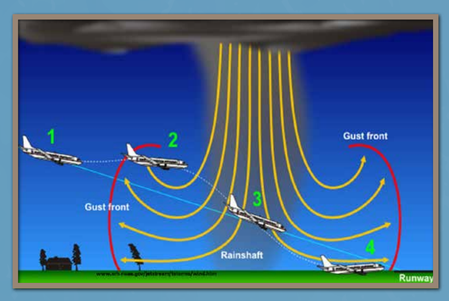
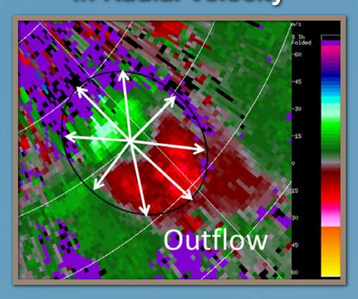
Introduction

- Microbursts and other severe wind-shear events present a serious safety concern to civilians and aircraft, particularly at low altitudes
- Automated wind shear and microburst detection is currently available at the largest and most exposed airports
- The NEXRAD Automated Microburst Detection Algorithm (AMDA) can bring automated wind shear detection to an extended array of airports

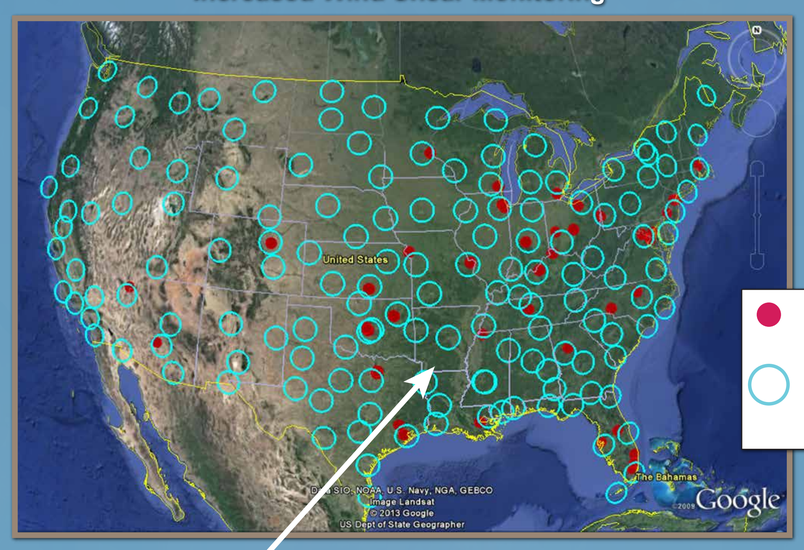


Microburst Signature in Radial Velocity



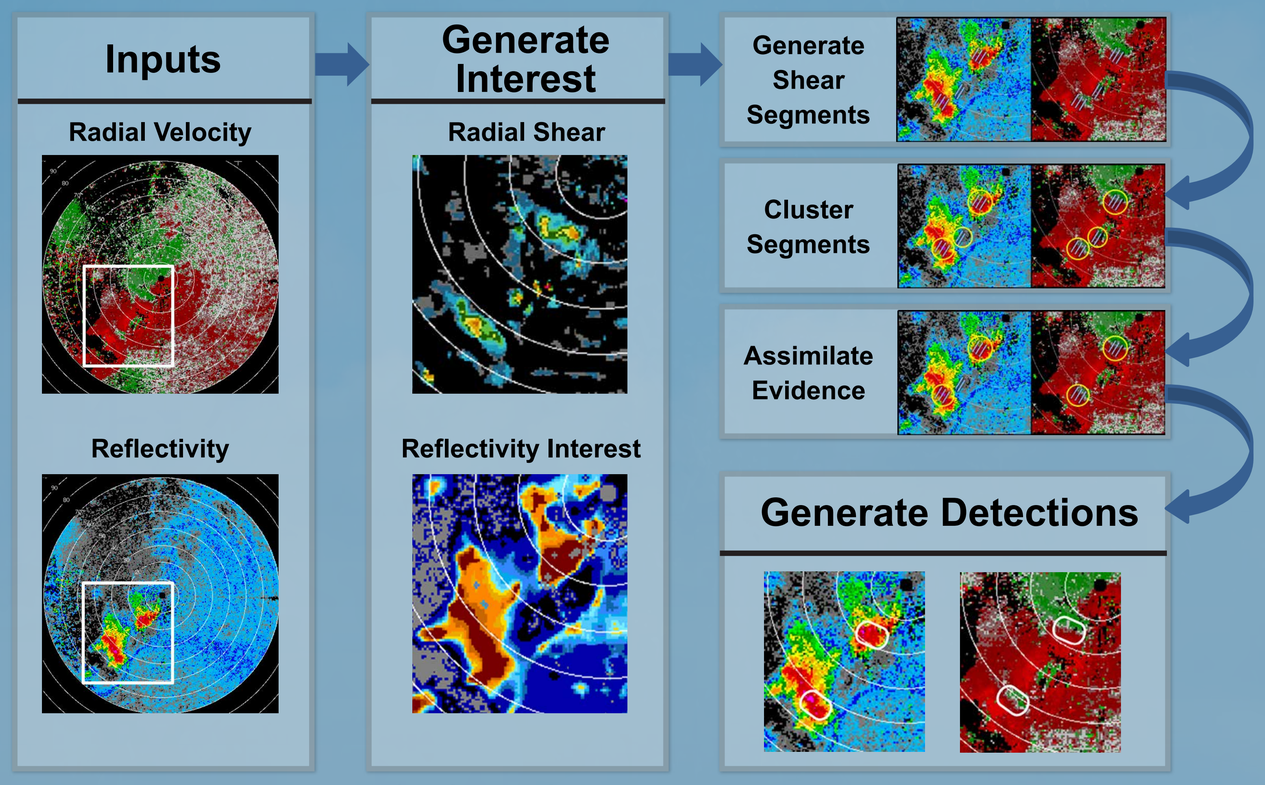
Benefit

Increased Wind Shear Monitoring

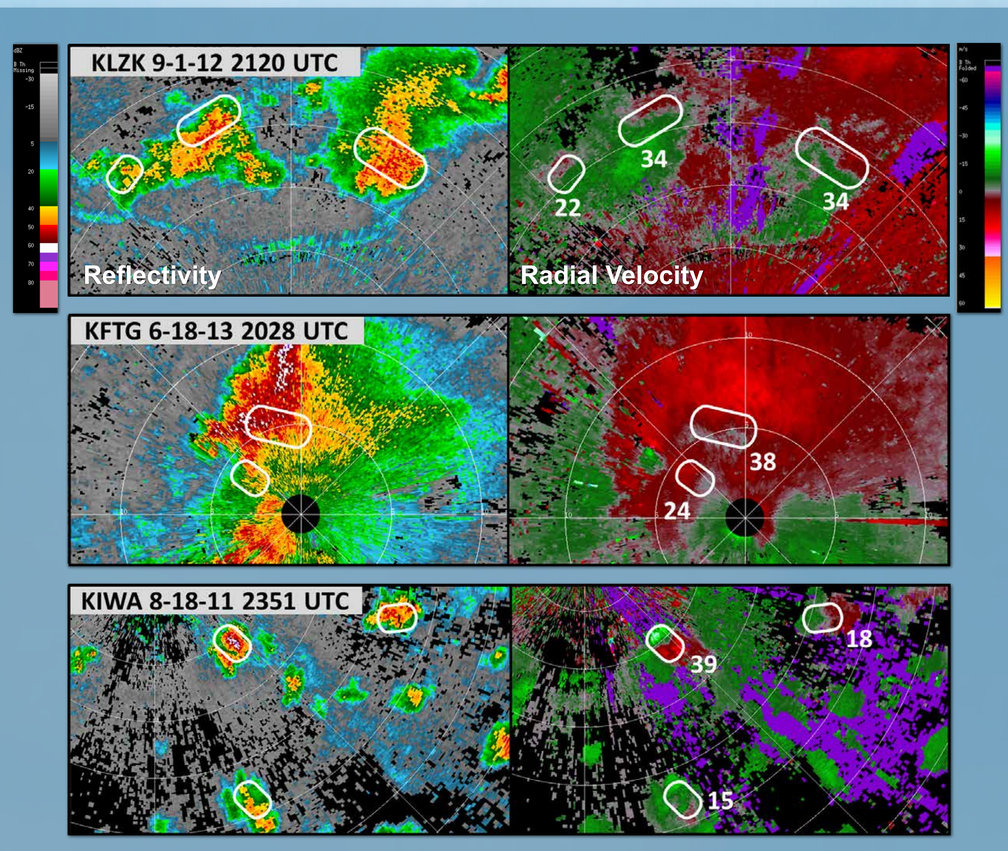


Location of American Airlines Flight 1420 Crash, 1 June, 1999.
This crash occurred in presence of storms generating severe outflows and divergent wind shear.

Algorithm



NEXRAD AMDA Algorithm Flow

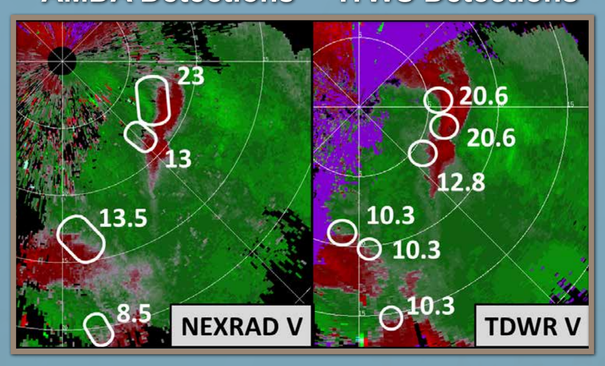


Algorithm Examples
Velocity loss in knots shown near each detection

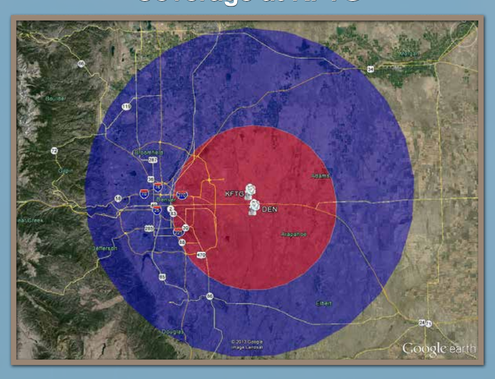
Verification

- AMDA Detections are matched to microburst detections generated by the Integrated Terminal Weather System (ITWS) processing Terminal Doppler Weather Radar (TDWR) data
- Comparisons were made at KFTG (Denver, CO) where coverage overlap between NEXRAD and TDWR is optimal

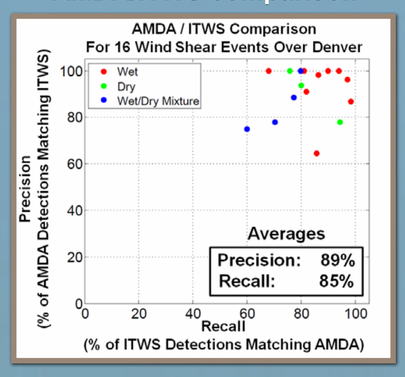
AMDA Detections ITWS Detections



AMDA (blue) and ITWS (red) Coverage at KFTG



AMDA/ITWS comparison



Conclusions

- Once approved for deployment, the NEXRAD AMDA can provide automated wind shear and microburst detection to a large number of small and medium sized airports not supported by a TDWR
- Despite the longer scan intervals in observing the base reflectivity and radial velocity compared to TDWRs, it is shown that NEXRAD AMDA generates operationally usable detections for both wet and dry microbursts
- Once AMDA performance is approved by the NEXRAD Technical Advisory Committee (TAC), it will be released as part of the Radar Product Generator (RPG) software Build 16 during Spring 2015

Future work

- Utilize supplemental surface scans (SAILS)
- Utilize dual polarization (dual pol) data
- Utilize NWP model data, e.g., Lapse Rates, Equivalent Potential Temperature, CAPE, DCAPE
- Add prediction component

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